

CDBG 401 Case Study

Instructions

CDBG 401 is the capstone course for the Office of Community and Rural Affairs (OCRA's) Grant Administrator (GA) certification training. It consists of a series of activities related to a case. This year, the case is on a wastewater treatment project from the City of Austin. This case is based on the narrative elements of an application for an actual project, but some elements have been adjusted.

The activities are designed to assess a participant's understanding of CDBG. Participants will complete base tasks expected of a GA and synthesize information provided through the training. The activities will follow the CDBG application and administration process and include multiple-choice assessments, task completion, or issue identification. For example, a section, a participant may have to complete a multiple-choice assessment and, find and fill in a CDBG form. This course will run for the month in September 2022. The deadline to complete all the forms is on Thursday, October 6, 2022 4:00pm ET:

1. National Objective
2. Environmental Review (ER)
3. Citizen Participation
4. Site Control
5. Procurement
6. Labor Standards
7. Implementation and Modifications
8. Closeout and Monitoring

Case – City of Austin Wastewater Improvements

The City of Austin's Sanitary Sewer System has issues with Sanitary Sewer Overflows (SSO's) and with the renewal of the city's National Pollutant Discharge Elimination System (NPDES) Permit. The city has received Notices of Violation from the Indiana Department of Environmental Management (IDEM) for the SSO's in the Austin Sanitary Sewer System. To address the SSO's and meet the new effluent limit for phosphorus, the specific components of the wastewater system needing to be rehabbed to increase capacity and constructed to meet the new effluent limit for phosphorus will include:

1. Increase the capacity of Lift Station No. 1 by replacing the three (3) existing pumps with new, higher capacity units and upgrading the pump controls to accommodate the large pumps. - The new pumps will be controlled by variable frequency drives to increase the efficiency of the station and reduce overall power costs. The new control panel will be housed in weatherproof structure to improve the system reliability and facilitate maintenance. Note the lift station is within the flood plain.
2. Increase the hydraulic capacity of the Oxidation Ditch Splitter Box - After the treatment plant influent flow is screened and de-gritted, it is split between the two Oxidation Ditches. This is accomplished by the Oxidation Ditch Splitter Box.

Currently the Peak Flow to the plant is approximately 3.4 MGD (2.88 MGD from LS 1 and the balance from LS 5 through 8). Once the proposed improvements to LS 1 are complete the Peak Flow to the plant will be approximately 5.8 MGD. The existing Oxidation Ditch Splitter box is not currently large enough to handle this increase in flow without overflowing. Therefore, under this task, the splitter box will be enlarged and deepened to reduce the velocity of the flow in this area. The weir lengths will also be increased to improve the accuracy of the flow split under peak hydraulic conditions.

3. Increase the hydraulic capacity of the Clarifier Splitter Box. - Flow from the Oxidation Ditches is combined and directed to the Clarifier Splitter Box. As with the Oxidation Ditch Splitter this splitter box cannot handle the increased flow rate from the LS 1 Improvements. This splitter box currently overflows during peak flow events. In 2017 the City attempted to address this issue by installing a cover over the box and constructing a containment dike. This improvement has limited the SSO associated with treatment unit during peak flows, however it will not be adequate once the flow to the plant is increased. Therefore, under this task the walls of the existing splitter box will be raised, and a new 120" sewer line will be installed from the Oxidation Ditch Effluent Channels to the Clarifier Splitter Box. The proposed improvements will also include grating, handrail, and access stairs to facilitate operation and, maintenance of the system.
4. Construction of the Phosphorus Chemical Storage Facility including the storage tank, building, chemical feed lines and associated site work. - To meet the new phosphorus limit, it was determined to feed poly aluminum chloride (PAC) to the Clarifier Influent flow stream. The most cost-effective way to purchase the chemical is in bulk. This will require the construction of a 6,000-gallon, heated storage facility (the chemical must be kept at 50 degrees Fahrenheit or above). The chemical will be injected into the clarifier influent flow stream by a chemical feed pump. Since this is a critical component of the system, a backup pump will also be required. The chemical storage building will be constructed just to the west of the existing Oxidation Ditches. Chemical feed lines will be extended from the storage facility to the Clarifier Splitter Box where the chemical will be injected into the flow stream.

The city's on-call engineering firm and the city's wastewater treatment operator have been collaborating in determining the needed improvements to the system to bring the Austin Sanitary Sewer System back into compliance with IDEM and the city's National Pollutant Discharge Elimination Systems Permit (NPDES permit) in addition to addressing the sanitary sewer overflows (SSO). To address the compliance with the NPDES permit's limitation for Total Phosphorous, a study was completed which included several alternatives: 1.) conversion of the treatment plant to a Biological Nutrient Removal (BNR) system; 2.) feeding Ferric Chloride; 3.) feeding Poly Aluminum Chloride (PAC); 4.) feeding Alum; or 5.) feeding Magnetite (Bio-M ag). It was determined the most cost-effective alternative was to feed PAC to the influent flow within the plant. To address the regular occurrence of overflows, the following

alternatives were reviewed by the city in consultation with their engineering firm: 1.) replace existing sewer lines in areas subject to excessive infiltration and inflow during storm events; 2.) slip line (cure-in-place lining) existing sewer lines in areas subject to excessive infiltration and inflow; or 3.) increase the capacity of Lift Station No. 1 to fully utilize the hydraulic capacity of the existing wastewater treatment plant. All alternatives will require upgrades to the splitter boxes at the plant to ensure the capacity of the splitter boxes is sufficient to handle the additional flow. The treatment facility already has sufficient capacity to handle the additional flow. When reviewing the scope of the issues impacting the city, the city proposed combining the most cost-effective alternatives to comprehensively address the issues. The measurable outcomes at the completion of the project will include a wastewater system that complies with the city's NPDES Permit AND a 90% to 100% reduction or the elimination of the sanitary sewer overflows (SSO) in the area of Lift Station No. 1 and the treatment plant clarifier. These are the areas where over 84% of the overflows occur. Without reducing or eliminating the SSO's the residents will continue to lose sewer service including the inability to flush their toilets and the wastewater manholes will continue to surcharge raw sewage during rain events. Without the needed improvements to meet the new NPDES permit requirements, the city will be at risk for fines and an agreed order with IDEM until compliance is achieved.

The City of Austin's Sanitary Sewer Overflows (SSO) are the result of infiltration and inflow (1/1) entering the collection System during rainfall events. During these events, the flow in the gravity sewers exceeds the capacity of the wastewater pump stations or at the clarifier splitter box (both of which will be addressed with this project). The increased flow to the lift stations results in sewage backing up in the gravity sewers which results in the SSO's. Since 2013, there have been 56 overflows reported. In 2015 and 2016 there were 28 overflow events with 14 overflow events each year. Approximately 63% of those reported were found in the Lift Station 1 Basin of the sanitary sewer collection system. Approximately 21% of the overflows were reported in the Treatment Plant Clarifier Splitter. Those two locations account for nearly 84% of the overflows and are included in this project.

The infiltration of storm water into the wastewater system causes not only overflows at the lift stations, but it also causes surcharging at nearby manholes. Surcharging is an overloading of the sewer beyond its design capacity due to inflow and infiltration of water. Austin's surcharging sewer often result in sewer overflow at manholes and residential customers' unable to use the facilities within their home. The overflows result in raw sewage by-passing the treatment facility and discharging on the roadway and diverted to local drainage ditches. Three main health risks are present because of raw sewage exposure: viruses, bacteria, and parasites. The issues being addressed by this project have a significant impact on residents. The city receives complaints from residences and businesses about their sewer service lines backing up during rain events and not being able to flush toilets, wash clothes, etc. The wastewater staff is quick to respond to the many calls. The log shows 22 rain events through November 1,

2018, where rains measuring .7", less than an inch, have caused residents trouble with their sewer connections. The following problems are occurring: 1.) Trouble flushing one toilet; 2.) water and dirt backing up in shower when water is used in other areas of the home; and 3.) sink and toilet gurgling when water is released through shower/washer/dishwasher."

A residential impact survey was conducted using Survey Monkey. The residents were notified of the survey on their sewer bill in addition to public service announcements. The survey was available for all residents online with hard copies available in Austin City Hall. There were 32 residents responding to the survey. Of those responding, 28 replied to a question "during or after a big rain do you have any of the following:" with the tabulated results showing 67.86% responding "toilets won't flush"; 60.71% "water backs up in your toilet"; 32.14% "observed sewer manhole overflow or water running out (surcharging)"; 35.71% were "unable to use washing machine"; 28.57% were "unable to use dishwasher"; 39.29% were "unable to use shower; and 25% had " other" issues including "water backing up, stinks in sinks usually after a rainfall, and the smell so bad had to get hotel room." There were also 9 of those responding who have had a plumber or contractor help with any damage caused by the previous issues. Based on the survey responses 22 of the 28 residents responding confirmed they have contacted the city with sewer complaints, seven have contacted the city multiple times.

The city's Wastewater Facility Inspection summary letters from the Indiana Department of Environmental Management (IDEM) have included Notice of Violation (NOV) for the SSO events. Per Part II. B. 2 of their National Pollutant Discharge Elimination System (NPDES) permit which prohibits overflows, pursuant to 327 IAC 5-2-8(11) "Any noncompliance with the terms of the city's permit may subject the city to an enforcement action which can include the imposition of penalties causing additional burden on the community." In 2015, with the renewal of the National Pollutant Discharge Elimination System (NPDES) Permit, there was a new effluent limit for phosphorus. To meet the new Phosphorus Limit, the city conducted a study and determined that the most cost-effective way to meet the new limit would be to add Polyaluminum Chloride (PAC) to the clarifier influent flow stream. The construction of the phosphorus feed system will bring the city into compliance with the NPDES permit and meet IDEM's requirements.

The proposed project is a priority for the city as it will assist the city in addressing the residents' issues with water back- up, manholes surcharging spilling untreated sewage into ditches, unable to use washing machine, shower and other issues affecting their health and safety while allowing the city to address IDEM's Notice of Violation and meet the NPDES permit requirements.

The City of Austin is focused on eliminating inflow and infiltration into the city's Sanitary Sewer System and meeting the requirements of the city's NPDES permit. In 2017, plant staff implemented a Lift Station Maintenance Plan to assure the lift stations are working at their optimum capacity. In 2015 the city initiated a smoke testing program designed to identify and eliminate sources of inflow and infiltration. City wastewater system

personnel purchased and conducted the smoke testing followed by repairing the defects discovered. The city spends a significant amount of the System's Annual Budget on this Program. In 2015 - 2017, the city spent approximately \$120,600 which includes the city personnel labor costs for 1200 manhours to smoke test, repair defects found, engineering and improvements to prevent overflows at the plant, and engineering and construction needed to address replacement of air and vacuum release valves on the Hardy Lake force main and renovations to lift station 8. At this time, the capacity of Lift Station No. 1 and the splitter boxes need to be increased to further reduce the frequency and duration of SSO's in the system.

The city must take action to meet the new Phosphorus Limit mandated by IDEM. The city conducted a study and determined that the most cost-effective way to meet the new limit would be to add Polyaluminum Chloride (PAC) to the clarifier influent flow stream. This chemical will bond to the phosphorus in the waste stream and settle it out in the waste sludge from the treatment process. Austin budgeted funds to address this need, previous costs expended to address the new phosphorus limits are \$24,500 to date.

The city purchased a chemical metering pump required for the phosphorus chemical feed system. In January 2018, one of the two clarifiers at the plant experienced a catastrophic failure of the scraper/dive mechanism. The city immediately contracted with a local company to replace the drive and scraper assembly at a cost of \$123,910. While the system remains solvent and there are funds for maintenance and operation, the cost of the replacement of the scraper/dive mechanism depleted the funds set aside to be utilized for the Phosphorus Removal System.

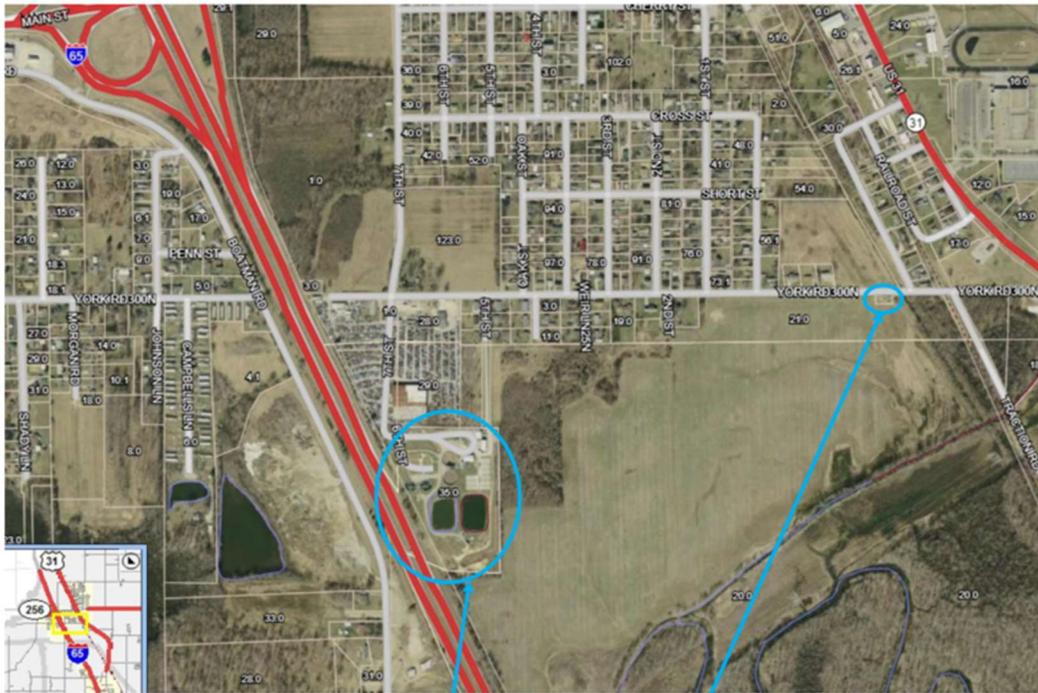
The scope of work for this project includes four components which will address what is required to bring the plant into compliance and is a comprehensive approach. Without the CDBG funding, completing the project as a comprehensive project addressing all issues the residents have and meeting IDEM's NPDES permitting requirements will not be possible. In that case, the city will need to further prioritize the tasks associated with the project and complete them one at a time as funds accumulate in the Wastewater/Sewer Utility Operating Fund over the next several years. Surcharging manholes emptying raw sewage into the streets and adjacent ditches and residents unable to flush stools when a rain event occurs continuing for an indefinite period of time will be the price paid. Austin strives to address issues with their sanitary sewer system without assistance from outside sources. However, this grant will expedite compliance with the NPDES permit and improve the quality of life for all system users and residents of the city by eliminating the SSO' s.

The city reviewed requirements to request funding through USDA- RD and the State Revolving Fund through their Wastewater Utility Programs; the cost and time required for the completion of a preliminary engineering report, time to complete the application forms which includes consultation of bond counsel, engaging a financial consultant for the required bond seemed to escalate the costs. In addition, the city currently has sewage revenue bonds requiring annual payments of principal and interest nearly

\$288,000. The city also investigated utilizing discretionary funds. There are not sufficient funds to cover the project costs and the funds have been allocated for other projects or uses. Recently, a major employer in the community has closed causing several of the residents to lose their jobs. With all the financing options weighed, the CDBG funds are the best option and will provide the gap funding the city requires expeditiously and less of an impact to the residents. The city will be investing \$159,000 in this project, approximately 22% of the total project costs. The local funds to be invested will be from the city's Sewer Operating Fund. The revenues and balance in the sewer operating fund will be able to maintain and sustain the improvements. The City of Austin will maintain the project for five (5) years after closeout.

Project Area Maps

City of Austin, Indiana



Wastewater Treatment Plant Lift Station #1
Project Locations

City of Austin, Indiana
Detailed Map Project Service Area/Boundaries of Jurisdiction



Project – Area of Improvements

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